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# EFFECTS OF SAUNAYOGA ON PEOPLE DIAGNOSED WITH RHEUMATIC DISEASES

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## EFFECTS OF SAUNAYOGA ON PEOPLE DIAGNOSED WITH RHEUMATIC DISEASES

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The aim of this thesis was to examine the effects and suitability of saunayoga for people with different rheumatic diseases. Calm, stretching and strengthening yoga poses and gentle heat of the sauna are combined in saunayoga. Saunayoga as an exercise method has been popular among people with rheumatic diseases, but the evidence-based information on the topic is lacking. Sauna as a traditional Finnish innovation can offer an easily accessible exercise environment.

The study was conducted as a questionnaire-survey. Altogether 113 answers were received from members of Finnish Rheumatism Association around Finland. Out of the 12 questions included in the questionnaire, 5 of them were focused on and demonstrated in this thesis. The selected research questions concentrated on investigating the intensity of the session, type and suitability of the poses and the effect of sauna and a warm environment in exercising. The results were received in 10.10.-21.11.2016 after a saunayoga trial. Qualitative and quantitative methods were used in analysis of the results.

Based on the results can be concluded that saunayoga could be beneficial and suitable treatment method for the majority of the individuals suffering from a rheumatic disease. However, every participant tolerates warmth differently, so the individualism has to be taken into consideration. Depending on the features, symptoms and activity of the disease, the suitability of saunayoga varies. The results demonstrated the intensity of the session to be convenient and no painful poses were experienced. The poses can be adapted and modified to be fitting for participants own condition and abilities. Based on the questionnaire, the majority of the participants reported positive feedback of sauna as an exercise place. These conclusions can't be generalized on everyone with a rheumatic condition, but can be utilized among health care professionals when designing a treatment plan together with the person with a rheumatic condition.

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# 1 INTRODUCTION

Rheumatic diseases are globally and nationally common factors causing pain and decrease of function and independence. Almost everyone experiences different types of musculoskeletal symptoms at some point of their life. This disease group has remarkable influence on Finnish public health and national economy. (Aho & Heliövaara 2002, 13.) There are a great variety of different rheumatic diseases and all of them has own characteristic features. The symptoms and suitable treatment methods vary notably between individuals. (Karjalainen 2007a, 9; Kauppi 2007, 21.) Since a specific rehabilitation protocol for rheumatic diseases is not created, individualism is a key concept when implementing rheumatic's treatment and rehabilitation (Luqmani et al. 2009, 437).

Heath can be used as a treatment method for people with rheumatic diseases. Heat's physiological effects on human body has been found beneficial for this client group. Increasing the muscle relaxation, blood flow and elasticity of the tissues results in reduction of pain and stiffness. (Hayes 2005, 156.)

This project was carried out in co-operation with Saunayoga International Ltd. and Finnish Rheumatism Association. This thesis was aiming to provide information about rheumatic diseases and demonstrate the diversity and wideness of them. It is introducing saunayoga's suitability for alleviation of rheumatic symptoms. The main aim was to investigate the relationships between rheumatic conditions and saunayoga.

The Finnish Rheumatism Association was founded in 1947 and functions nationwide, having 157 member unions distributed around Finland. The association organizes different campaigns and projects for example concerning the prevention and treatment methods in musculoskeletal health. The Finnish Rheumatism Association is a great influencer and developer on Finnish public health and welfare. The association aims in promoting benefits and rights of people with long-term rheumatic or musculoskeletal diseases. (Website of Finnish Rheumatism Association 2016.)

Saunayoga consists of different yoga poses implemented in a warm and peaceful environment, sauna. (Website of Saunayoga, 2014) Heat has been commonly studied as a treatment method for rheumatic diseases, however usually addressing to local heat treatment, such as ultrasound, applied on a specific body part (Hayes 2005, 158). Sauna bathing results to thermal strain effecting the entire body. That leads to more comprehensive impact of body's physiological functions. (Crinnion 2011, 216.) Sauna's effect on rheumatic diseases isn't studied much, adding the value and interest to this topic.

Many people with rheumatic diseases have tried saunayoga and experienced it beneficial for their condition. Saunayoga International Ltd. and Finnish Rheumatism Association have done co-operation since 2013 in different projects. (Vainio 2017.) The material was collected as a questionnaire form answered by the participants, members of the Finnish Rheumatism Association, after one trial of saunayoga. The participants answered questions concerning the environment, warmth and intensity, for instance.

The selection of this specific subject was based on author's own interest towards the topic, possibility for co-operation and the fact that it could provide new information. Also the current topic and the possibility for others to benefit from the material led to the selection. Examining saunayoga's effects on rheumatic diseases with theoretical background supporting the study, these results can be beneficial for many professionals working with rheumatic diseases and also for the individuals suffering from these conditions. In addition the collaborators receive information that can be used in the future.

The common prevalence of rheumatic diseases, affecting the most of us is one factor why this topic is so current today. Saunayoga is becoming more familiar among the population and interest towards it and general well-being is growing. If suitable for the individual, Saunayoga could provide a low threshold place for physical activity since most Finns have access to sauna at their own homes.

## 2 RHEUMATIC DISEASES

### 2.1 Definition of Rheumatic diseases

Internationally, rheumatism comprises of musculoskeletal and rheumatic diseases, including over 150 diseases and syndromes. These diseases are commonly progressive and associated with pain. Musculoskeletal conditions with the most considerable effect on society are rheumatoid arthritis, osteoarthritis, spinal disorders and severe limb traumas. (Website of World Health Organization, 2017) However, the term rheumatism contains a great variety of different diseases (Table 1.) (Karjalainen 2007a, 9).

Initially rheumatic diseases have been considered as painful musculoskeletal conditions (Website of Duodecim, 2017). Musculoskeletal systems consists of bones, muscles, joints and tendons that enable the proper movement and function of the body. (Isomäki 2005, 3) Symptoms in rheumatic diseases doesn't necessarily affect the musculoskeletal system. The symptoms can occur also on skin, blood vessels or kidneys. These are called systemic connective tissue diseases. (Website of Duodecim, 2017.)

Nowadays rheumatic diseases has become generally used concept for rheumatic conditions like rheumatoid arthritis, juvenile rheumatoid arthritis and ankylosing spondylitis (Website of Duodecim, 2017).

Rheumatic diseases can be divided into inflammatory, degenerative and soft tissue diseases. Inflammatory rheumatic diseases are for example rheumatoid arthritis and systemic connective tissue diseases. Acute inflammatory conditions are also part of this group. Non-inflammatory rheumatic diseases are osteoarthritis, back problems and osteoporosis. Generally these conditions are termed degenerative because of their relation to aging. An example of still quite indefinitely determined soft tissue rheumatic disease is fibromyalgia, a chronic soft tissue disease. (Karjalainen 2007a, 9.) The diversity of different rheumatic diseases is demonstrated in the Table 1.

Table 1. Classification of rheumatic diseases (Karjalainen 2007b).

Inflammatory rheumatic diseases	Non-inflammatory rheumatic diseases
<ul style="list-style-type: none"> <li>• Rheumatoid Arthritis</li> <li>• Spondylartropathy</li> <li>• Systemic connective tissue diseases</li> <li>• Juvenile Arthritis</li> <li>• Crystal Arthropathy</li> <li>• Bacteria/virus related joint inflammation</li> <li>• Other</li> </ul>	<ul style="list-style-type: none"> <li>• Osteoarthritis</li> <li>• Osteoporosis</li> <li>• Degenerative Arthritis of the Spine</li> <li>• Fibromyalgia</li> <li>• Rheumatic symptoms related to hormonal and metabolic diseases</li> <li>• Other</li> </ul>

Rheumatic diseases among other musculoskeletal conditions are the leading causes for disability, remarkable activity restrictions, work disability and health care costs (Website of World Health Organization, 2017; Middleton et al. 2013, 2). The most common form of degenerative rheumatic disease is osteoarthritis. Joint cartilage wears out progressively, leading to musculoskeletal symptoms like loss of function and increase of stiffness and pain causing reduced physical ability. (Middleton et al. 2013, 2.) Osteopenia and osteoporosis, causing loss of bone mineral density are developed in progression of the disease resulted by physical inactivity and cortisone treatments. These factors predisposes for osteoporosis related fractures and fear of falling among the osteoarthritis patients. (Brodin & Swärdh 2015, 1.)

Rheumatoid Arthritis is the most common type of inflammatory arthritis and is distributed around the world. In different nations the incidence is higher than in others, mostly depending on the age range of the population since rheumatoid arthritis is more common among elderlies. Studies have shown that in Finland the incidence differs notably depending on the region lived in. People in Eastern Finland tend to suffer more from rheumatoid arthritis than the residences in the coast of Western Finland. In addition to the nationality and the place of residence, other predisposing factor for this disease is genetic heritage. Also living environment plays a role in this since good social circumstances has been studied to prevent from catching the disease. Anyhow

it still isn't clear if the crucial factor is better hygiene, nutrition or the mental wellbeing. Other predisposing factors are smoking, an earlier ailed infection or female gender. (Martio 2009, 3.)

Rheumatoid arthritis is diagnosed for 1700 people in Finland annually. Overall, there are approximately 35 000 adults in Finland suffering from this condition. (Website of Finnish Rheumatism Association, 2016.) Juvenile rheumatoid arthritis is similar to Rheumatoid arthritis, but when diagnosed for under 16 years old, the term "Juvenile rheumatoid arthritis" is used (Martio 2009, 3.) Degenerative rheumatic diseases such as osteoarthritis develops in older age. Inflammatory rheumatic diseases can be diagnosed in all ages. For example, ankylosing spondylitis, type of rheumatic disease that causes inflammation in the joints of the spine is commonly diagnosed for young adults. (Karjalainen 2007a, 10.)

First symptoms of rheumatoid arthritis are usually chronic ache that varies in quality, intensity and region. Joint swelling, stiffness, soreness, tiredness and stress reactions are common. (Brodin & Swärdh 2015, 1.) Because of the diversity of existing rheumatic diseases many musculoskeletal symptoms are counted as rheumatism, but determining a specific diagnosis can be difficult. That makes the treatment more challenging. (Heliövaara 2007, 10.) The criteria for diagnosing rheumatoid arthritis are collected by the American College of Rheumatology. Classification criteria is based on algorithm where points are gathered depending on joint indication, acute reactions, such as blood values, and duration (>6 or <6 weeks). For majority the condition becomes chronic. In addition to the acute phases, there is calmer remission periods. With the developed medicine in rheumatology, prognosis of rheumatoid arthritis has become better and advancement of the disease has generally become slower. (Brodin & Swärdh 2015, 1.)

Inflammation is produced when the white blood cells and immune proteins protects the body from bacteria and viruses coming from outside. However, in inflammatory type of rheumatic disease, the body builds up an inflammatory condition, even though there isn't a need for protection. The body's own immune system ends up damaging the tissues. Rheumatoid arthritis is an example of this kind of autoimmune disease. (Website of the WebMD, 2015.) The beginning and cause of the disease is still often



uncharacterized. In chronic joint inflammation the synovium around the joint gets irritated which results to gathering of fluids inside the joint. The inflammation can be temporary, but if the condition prolongs the joint structures can be damaged permanently. (Kauppi 2007, 22.)

## 2.2 Main principles in treatment and rehabilitation of rheumatic diseases

Treatment in chronic rheumatic diseases requires patient, multi-professional co-operation between different health care professionals. There are variety of different treatment methods among these diseases, the challenge is to find suitable combination of treatments for the individual and adapt the treatment plan if necessary. (Kauppi 2007, 21.)

Main principles in treatment of inflammatory rheumatic condition are to diminish the existing inflammation, alleviate other symptoms and prevent from further damage of the joints and other tissues. One aim in the treatment is also to find suitable methods for the individual to prevent long-term complications, improve quality of life and maintain the physical capability and independence of daily living. (Calabro et al. 2016, 357.) Independence of daily living explains person's general ability to cope with physical, social and mental challenges in life. The wide concept of independence of daily life is composed by assessments and measurements of multi-professional team but patient's own view is substantial. This general view helps in making evidence based treatment and rehabilitation plans. (Arkela-Kautiainen & Häkkinen 2007, 166.)

It is crucial to get the diagnosis early and start the treatments instantly. The beginning of the treatment should be intense to stop the inflammation as soon as possible. It is important to follow the state of inflammation and disease activity closely by the doctor and also by the patient. Through strict observation the inflammation can be managed better and prevention of the joint and tissue damage is more efficient. Rheumatic diseases can be medicated by drugs but sometimes surgical operations are necessary. For instance joint replacement surgeries can be very beneficial if the worn out joint and

pain limits the range of motion and quality of everyday life. (Website of Arthritis Foundation 2016.) As the progression of the disease varies remarkably between patients individualized management plans are recommended. Patients should be offered occupational and physical therapy to maintain independence and ability in daily living. Home assessments and observation for need of assistive aids as well as functional exercises to improve mobility and to diminish the bone loss are noticed to be beneficial for rheumatoid arthritis patients. (Luqmani et al. 2009, 437.)

Disability and other limitations are developed due to the progressive joint dystrophy. These limitations lead to other significant factors affecting quality of life such as social competence and mental wellbeing. When suffering from a chronic disease a person must commit to the treatments and understand the importance of self-management of the disease to ensure the optimal condition and prevent worsening of the condition. By self-management, the patient can independently affect the progression of the disease as a part of the daily activities. Self-management in rheumatoid arthritis patients consists of medication and additional therapies and treatments for instance heat therapy, exercising, manual therapy and hydrotherapy. Also receiving enough rest and maintaining good relationships are important factors in self-management, because 17-27% of rheumatoid arthritis patients suffer from depression. (Kordasiabi et al. 2016, 156.)

Pain is the dominant symptom in rheumatic diseases. There are many types of pain depending on the disease, location and the cause of the pain. Treating the pain requires knowledge and understanding of the mechanisms and typical characteristics of the pain. (Martio 2007, 115.) Pain can be acute or chronic and depending on the type, they are treated differently. Different medications are used in treating pain in rheumatic diseases, for instance non-steroidal anti-inflammatory drugs, cortisone injections and locally applied creams. (Martio 2007, 129.)

The treatment of inflammatory rheumatic diseases has developed significantly. Because of the unknown etiology, multiple different methods have been used to cure this condition. For thousands of years rheumatic conditions have been treated with different spa treatments, acupuncture and herbs. These old treatment methods are still used to some extent. Locally affecting treatments are especially favored for these conditions. (Martio 2007, 23.) In addition to the medical treatment pain is also treated with

physical therapy. Physical therapy can consist of heat and cryotherapy, electrotherapy and most importantly movement therapy. Cryotherapy is effective for treating the acute pain and inflammation of the joint. Local cryotherapy can be done by applying a cold package from the freezer on the painful spot, for instance. Cold normalizes the body temperature and the swelling diminishes. Heat treatments are not recommended for treating an inflamed joint, but can be beneficial in other phases of the disease. Heat has been studied to be beneficial especially in the treatment of osteoarthritis. Heat relaxes the muscles, relieves pain and improves the stretching of the fibrous tissue. (Mikkelsen 2007, 114.)

### 2.3 Rheumatic diseases and Physical activity

There has been discussion, if exercising increases the disease-activity and aggravates the pain on arthritic joints. Osteoarthritis Research Society International, Ottawa Panel and the American College of Rheumatology (2004) have stated conversely that regular, moderate activity stores physical function and increases strength and endurance in people with arthritis. People with rheumatic diseases that are physically active are examined to sleep better, be more energetic and experience less pain, yet rheumatic diseases are reckoned as one of the most common reasons for restrictions in physical activity. Inactivity leads to muscle tendon shortening as well as weakened muscles and ligaments. (Haaz, Bartlett 2011, 34.) The joint destruction leads to restrictions also in muscle strength, endurance and aerobic capacity (Baillet et al. 2009, 410-411)

Physical activity has a great impact on controlling the progression of the condition. During the inflammation phases it is important to rest and perform gentle non weight-bearing exercises. (Baillet et al. 2009, 410-411.) Major studies has proved moderate, weight bearing exercises to be the most beneficial form of activity for inflammatory rheumatic disease patients. According to the Centers for Disease Control and Prevention (CDC), exercising decreases pain, improves function, motion and social well-being for patients with different kinds of rheumatic diseases. (Middleton et al 2015, 2.) However, for people with major joint dystrophy, instability and active inflammation this may not be recommended (Haaz, Bartlett 2011, 34). Long-term aerobic and

strengthening exercising with moderate or high intensity has been found beneficial for people with arthritis. Positive results are shown in oxygen uptake, muscle performance and physical ability. (Brodin & Swärdh 2015, 3.) It has been studied that rheumatoid arthritis patients following a dynamic exercise program develop their muscle strength and endurance, but also health related quality of life better than the control group with conventional joint rehabilitation. (Baillet et al. 2009, 410-411.)

### 3 SAUNAYOGA

Saunayoga International Ltd. is a developer of three different types of practices executed in sauna. Saunayoga International Ltd. became a licensed trademark in 2012, but the idea of this concept was born already in 2010. (Vainio, personal communication on 9.10.2017.) The founder of Saunayoga International Ltd, Tiina Vainio, has published two books: *Saunayoga – Finding Calm and Relaxation* in 2012 and *Sauna Pilates – Wellbeing for the Back* in 2015. Both demonstrates different sequences of poses and can be adapted to everyone despite of the age or physical condition. (Website of Saunayoga, 2014)

Saunayoga is a combination of a quiet and calm sauna and simple, stretching and strengthening yoga poses uniting different yoga styles. While strengthening and stretching the entire body, the mind is also resting. (Vainio 2012, 11) The session is carried out in Sauna, approximately in 50°C temperature. Majority of the poses are done in seated position. Sauna Yoga includes stretching and mobilizing movements that helps to relieve tensions especially in the neck- and shoulder areas adding movement in the spine (picture 1.). In addition there are strengthening movements focusing on the musculature in the trunk and lower limbs. Relaxing, deep stretching poses combined to the soft warmth of the sauna improves the range of motion and melts away the strains, relaxing the body and mind. (Website of Saunayoga 2014.) Its fundamental principles includes correct breathing and posture focusing on the midline of the body supported by the trunk. The movements are focused to affect all directions and the shifts to happen calmly in stages. (Website of Saunayoga, 2014; Vainio 2012, 16)

Saunayoga consists of active exercises that are done by individual's voluntary muscle action. Strengthening and stretching exercises can be done without using any equipment, which makes training easier to be practiced anywhere. (Website of Saunayoga 2014.) Regular stretching increases the range of motion in the joint and helps in improving physical ability in everyday life (Porter 2013, 281). Saunayoga is noted to accelerate the metabolism, decrease stress and improve the quality of sleep. (Vainio 2012, 11)



Picture 1. Rotational movements in the spine are one of the fundamentals in Saunayoga (Charlotta Boucht).

Another fitness system instructed in sauna is Sauna Pilates. It differs from Saunayoga by the way of using body and the technique characteristic for Pilates. It is performed in seated position, in the temperature of 50°C. Sauna Pilates focuses on the musculature of neck and shoulder regions and challenges the strength and stability of the trunk. Saunayoga International Ltd has also developed a special type of Sauna Yoga for people with disabilities, suffering with mobility issues or other physical restrictions. (Website of Saunayoga, 2014.)

## 4 PHYSIOLOGICAL EFFECTS OF SAUNA

### 4.1 Sauna

Sauna bathing and other mechanisms of heat affecting the body are still quite unclear (Website of Duodecim 2012). Sauna bathing develops a thermal strain affecting the entire body. This strain has an effect on cardiovascular system by increasing the heart rate and peripheral circulation. Heat is allowed to penetrate the skin better and other physical changes emerge. Diastolic and arterial blood pressures decrease, metabolism and oxygen consumption rates gets higher. Similar events happens in the body during a moderate exercise. The sympathetic nervous system activates, muscle relaxation occurs and tendons joint regions becomes more elastic. Though water and electrolyte loss happens via sweating, it is compensated by additional adrenaline secretion. (Crinnion 2011, 216.)

Heat applied locally to a specific part of the body doesn't affect the whole body systems such as circulation and immune systems. Finnish sauna develops a whole-body hyperthermia that warms the muscles, increases the tissue temperatures and promotes body adaptation. (Nosaka, K, Sakamoto, K, Newton, M, Sacco, P 2004, 135.) It is researched that sauna before eccentric exercise increases passive range of motion in flexion and extension directions in wrist extensors, grip strength and wrist extensor strength (Khamwong, P et al 2015, 4-6). Regular sauna bathing combined to exercise therapy has been studied to reduce pain (Crinnion 2011, 218-219). Sjögren's syndrome is an autoimmune disease where the immune cells are developing antidote against own tissues, causing dryness of the skin, rash and tiredness among other symptoms (Website of Finnish Rheumatism Association 2011). Patients with this condition reported significant improvements in symptoms after 4-week period of regular sauna bathing. Rheumatoid arthritis and ankylosing spondylitis patients tried sauna bathing for 4 weeks, 2 times a week. 30 minute sessions in 55°C temperature didn't show significant statistical improvements but subjectively all the participants reported temporary reduction of stiffness and pain during the sauna therapy. Also patients with chronic fatigue recognized improvements in fatigue, pain and sleep. (Crinnion 2011, 218-219.)

One factor affecting the reduction of the pain during sauna bathing is the secretion of endorphin in the brain (Website of Duodecim 2012).

#### 4.2 Heat in Rheumatic diseases

Heat treatments are part of physical treatment methods and together with cryotherapy one of the oldest forms of physical therapy in treatment of rheumatic diseases (Robertson, Ward, Low, Reed 2006, 313). Heat has been examined to relieve pain and reduce stiffness in patients with rheumatic diseases by relaxing the muscles, improving the blood flow and increasing the elasticity of the tissues. These physiological events concerns also people without a rheumatic diagnosis. When increasing the skin temperature to 45 °C over the joints of an asymptomatic hand with infrared radiation, the stiffness decreases by 20%. (Hayes 2005, 156.)

Heat applied locally on rheumatic joints has been suggested to accelerate the joint collagen degradation and increase the disease activity. However, no significant evidence of neither of these was found. (Hayes 2005, 158.) In the chronic stage of a rheumatic disease heat treatments are experienced comfortable and beneficial. Heat therapy is usually executed by applying superficial heat or ultrasound on the effected joint. (Mikkelsen 2002, 567.)

Heat's ability in relieving rheumatic symptoms is investigated more. Heat is commonly expected to relieve pain and stiffness. Heat treatments have also been recorded beneficial in decreasing swelling and tenderness in arthritis patients. (Hayes 2005, 162.) For example, in Norway and Sweden patients with rheumatic conditions are offered a 4-week rehabilitation period abroad, in a warm climate as a therapeutic option. There is moderate evidence that comprehensive rehabilitation combined with warm climate improves body functions and subjective quality of life and decreases fatigue and pain within rheumatic arthritis patients. (Forseth, Husby, Hafström, Opava, 2010, 900.)



## 5 YOGA

### 5.1 Definition of yoga

Yoga is an old form of mind-body integration that originates from ancient India and has ever since spread all over the world. “Hatha” yoga, originally referring to the physical part of yoga was practiced when preparing for meditation. Nowadays “hatha” yoga has developed to be a popular form of physical activity, stress control and self-awareness exercise. (Website of Yoga Journal 2017.)

Yoga is an all-round exercise form integrating the physical and mental aspects to one performance. Concentration on breathing, mental focus, stress control, social and meditative centering are all combined to physical activity. A typical yoga session focuses on achieving a proper posture, deep breathing and awareness of the body. (Haaz & Bartlett 2011, 34.) Yoga usually starts with gentle and slow movement sequences for warm-up followed by different poses engaging the entire body. Poses includes versatile movements in abduction, adduction, extension, flexion and rotation directions. The benefits of yoga effects body in multiple ways. Increasing the blood flow and metabolism, practicing static postures to improve muscle strength and balance and moving joints through their full range of motions increases mobility and flexibility. (Haaz & Bartlett 2011, 34.) Combining breathing to calm movements enables in recognizing the muscles, joints, mobility and postures. Commonly yoga poses have an influence on the spine, adding the space and mobility between the vertebrae. (Sillander, Valanne & Kelomaa-Sulonen 2003, 15)

### 5.2 Yoga & rheumatic diseases

Many rheumatic diseases affect the joint structures and muscles surrounded by the joint. Generally coordination, proprioception, the awareness of the position and balance are affected. Yoga is a type of recreational, body awareness exercise for these impairments. (Website of American College of Rheumatology 2017.)

Yoga, as a mind-body intervention, is considered suitable form of physical activity for people with a rheumatic disease because of the combination of possible stress management and mindfulness to exercising. Yoga is one of the most commonly used form of exercising as a complementary self-management practice among adult population. Different, basic yoga styles has been studied quite much. The strongest evidences has been found in decreasing the pain and improvement in the mood. (Moonaz, Bingham, Wissow & Bartlett 2015, 1196.) Relaxation is found beneficial as a part of self-care for people with rheumatic diseases. Stretching, yoga and meditation are presented as suitable relaxation methods. When relaxing, activity of the nervous system accelerates and endorphin is secreted in the body resulting satisfied feeling and reduction of pain. Calm environment without distractions is a suitable place for relaxation. (Website of Finnish Rheumatism Association 2016.)

Yoga's physiological effects on a person with a rheumatic disease are still unclear. Most of the existing studies were conducted with small sample sizes, non-randomized trials and incoherency in methods and outcomes, which decreases the reliability of the studies. Nevertheless, the evidence from different reviews conclude that yoga has positive effects on joint tenderness, pain, stiffness and function. After 8 weeks of regular yoga practicing, sedentary patients with rheumatoid arthritis and osteoarthritis reported significant improvements in health and fitness components such as walking capacity, flexibility and self-efficacy. (Moonaz, Bingham, Wissow & Bartlett 2015, 1197-1198.)

It has been examined in American College of Rheumatology, that range of motion and flexibility exercises are important part of rheumatic patient's self-care. Strengthening the muscles around the affected joints and improving the mobility in the joints builds up a better posture, prevents from injuries and improves physical capability in day to day life. (Middleton 2015, 2.) Ensuring safety, it is especially important for arthritis patients while focusing on stretching, strengthening and posture, to bear in mind during yoga sessions to adjust the pace and intensity within own sensations (Haaz & Bartlett 2011, 34).

## 6 AIMS AND OBJECTIVES OF THE THESIS

The main aim of this thesis is to gather information about Saunayoga's effects on people suffering from a rheumatic disease. In addition different rheumatic conditions and Saunayoga as an exercise form were introduced. The objective, based on the results, is to examine Saunayoga as a tool in rehabilitation of rheumatic diseases and to provide useful material for both Saunayoga international Ltd. and Finnish Rheumatism Association. Also different health care professionals working within the field could benefit from the information and the reported conclusions. Highlighting the importance of patients' own role, this material aims to provide information and introduce a possibly new, easily accessible, low threshold self-management method.

Based on the questionnaire, the main subjective effects of yoga in the heat of sauna (50°C) and sauna's suitability as an exercise environment for people with rheumatic diseases were examined. Other research questions focused on finding conclusions from the questionnaires whether the participants with rheumatic diseases found the instructed saunayoga poses suitable for their condition and what type of saunayoga pose was the most convenient for them.

## 7 IMPLEMENTATION OF THE RESEARCH

### 7.1 Research methods

Research is systematic, logical, controlled, empiric and critical observation of phenomena. Research can also be defined by its meaning to solve problems or find and investigate new factors. People for example with chronic diseases are interested in knowing what kind of and how strong evidence a certain treatment method has. A wide sample size, suitable research method, high quality references and critical observation increases the reliability and usefulness of the study. (Kankkunen & Vehviläinen-Julkunen 2009, 23-24.)

Research methods explain how new, factual information is gathered with the help of a study. Methods are chosen based on the investigation strategy, techniques and the nature of the study. When deciding the research method, the researcher should get acquainted with different methods and compare them to the research phenomenon and research questions. (Kankkunen & Vehviläinen-Julkunen 2009, 40-41.) Experimental settings can be used to observe one phenomenon's effect on another phenomenon (Kankkunen & Vehviläinen-Julkunen 2009, 46). In this questionnaire survey saunayoga's effect on rheumatic diseases was observed.

Basis of a successful study are epistemically coherent problem setting, science philosophy, research strategy and theoretical understanding. Epistemology is a branch of philosophy that estimates the origin and limits of human knowledge. In addition, a good research includes clear meaning and aim of the study and understanding how the studied results are proved in the text. (Hirsjärvi 2007.)

### 7.2 Qualitative & quantitative research

Qualitative research method is usually working with open questions, written texts, interviews or conversations. It is aiming to focus on the experiences of individuals themselves. In qualitative research, people can speak with their own words and describe

feelings clearer and not having to categorize them like in quantitative type of studies. (Grossoehme 2014, 109-110.) Typical characteristics of qualitative studies are subjectivity, flexibility, natural contexts and uniqueness of the answers (Kankkunen & Vehviläinen-Julkunen 2009, 56).

Quantitative research method focuses on measuring the variables, use of the statistical methods and observation of the relationships between different variables. This method can be adjusted in variety of different types of studies. Characteristic for quantitative methods are measurable variables, numeric measuring, objectivity and observation of statistical significances. Typical quantitative method is a survey study where the data is collected with forms or questionnaires. (Kankkunen & Vehviläinen-Julkunen 2009, 41-42.)

Qualitative and quantitative methods can also be used together, combining features of both methods. This approach is called the mixed method. Its aim is to provide a clearer and more comprehensive understanding of the research problems. Mixed method is discovered beneficial in health care field, because of its closeness to the individual but it also offers numeric, clinically important data. (Palinkas 2014, 861.)

### 7.2.1 Questionnaire

Survey research is a method used when collecting information of a specific focus group. Methods of sampling in a survey research can vary. (Website of Research Connections, 2016.) In this thesis the material is collected as a questionnaire survey including both open-ended and closed-ended questions. In a good questionnaire the questions are in logical order and presented clearly, asking only one question at a time. A good question does not live room for interpreting, allowing everyone to understand the question similarly. (Website of Research Connections, 2016.)

The research material for this thesis was gathered as a form of a questionnaire (Appendix 1). The questionnaire survey was established using mixed method, including both quantitative and qualitative features.

It is important that the questionnaire design meets the aims of the research. Research questions should be clear and well limited before designing the questionnaire, ensuring that the researcher gets the wanted data from the questionnaire. If this factor isn't given enough thought, the collected data may not correlate completely with the goals and aims of the study. Planning carefully before implementing the questionnaire helps in finding relevant, efficient and concise questions. (Burgess 2001, 1-3.)

The questionnaire was planned together with the collaborators from Saunayoga International Ltd. and Finnish Rheumatism Association. The questions were planned so that the both parties would benefit from them and the questions could be answered after one session of Saunayoga. From many ideas, 12 questions were selected to the eventual questionnaire. Out of these questions five (5) were open-ended and seven (7) closed-ended. Before beginning the writing and analyzing process, the questions were limited to five (5), to be able to concentrate more precisely on these specific topics. The eventual research questions were created by limiting the questions to be focused on.

This thesis focused on what the heat and sauna as environment brings to the exercising, examining the suitability of the poses and the most beneficial type of poses for people with rheumatic diseases. These specific questions were chosen due to the interest on physical aspects of saunayoga on people with rheumatic diseases. Examination of the combination of beloved Finnish sauna and common, nationally significant diseases as a topic aroused interest. The rest of the questions are for the collaborators to use as information and development tool. These questions are handling mostly the features of the instructor, the possibilities of practicing saunayoga at home and how did they find saunayoga.

### 7.2.2 Participants

The participants in this study were members of Finnish Rheumatism Association, experimenting a free trial of saunayoga. Eventual amount of people who participated by

answering the questionnaire was 113. Particular exclusion criteria wasn't created. Belonging to the Finnish Rheumatism Association stands for having a rheumatic disease, any type was accepted. Additional information about the participants wasn't recorded, which means that the conditions inside the sample group can vary markedly. All the recorded responses were taken into account in the analysis.

### 7.3 Research progression

Preparation for this research project started in the early autumn 2016. Planning the questionnaire started then and continued during the autumn. The questionnaire was intended to be finished until 7.10.2016 to be able to be answered during the "Reumaviikko", when saunayoga was instructed to the participants. "Reumaviikko" was arranged in 9-16.10.2016. The Finnish Rheumatism Association and its member unions have spent the national "Reumaviikko" since 1940s (Website of Finnish Rheumatism Association, 2016).

The questionnaire was modified and adjusted several times, until the final form was uploaded to E-lomake in 12<sup>th</sup> October 2016. 113 answers were received between 10.10. – 21.11.2016. Collection of the data occurred together with the help from the contact person in Finnish Rheumatism Association. 94 answers were received as a paper form, filled on the spot after the session. The questionnaire was also available to be answered online at home. If answered at home the subsequent effects of the session could be reported better than for those who answered instantly. The associate in the Finnish Rheumatism Association transferred the paper questionnaires into online forms. Answers were received around the country from different municipalities' rheumatism associations that decided to take part into this saunayoga trial. Saunayoga trial was executed during the week on 30 different member unions around Finland. Altogether approximately 150 people took part of this trial. The progression of the thesis process is demonstrated in the figure 1.

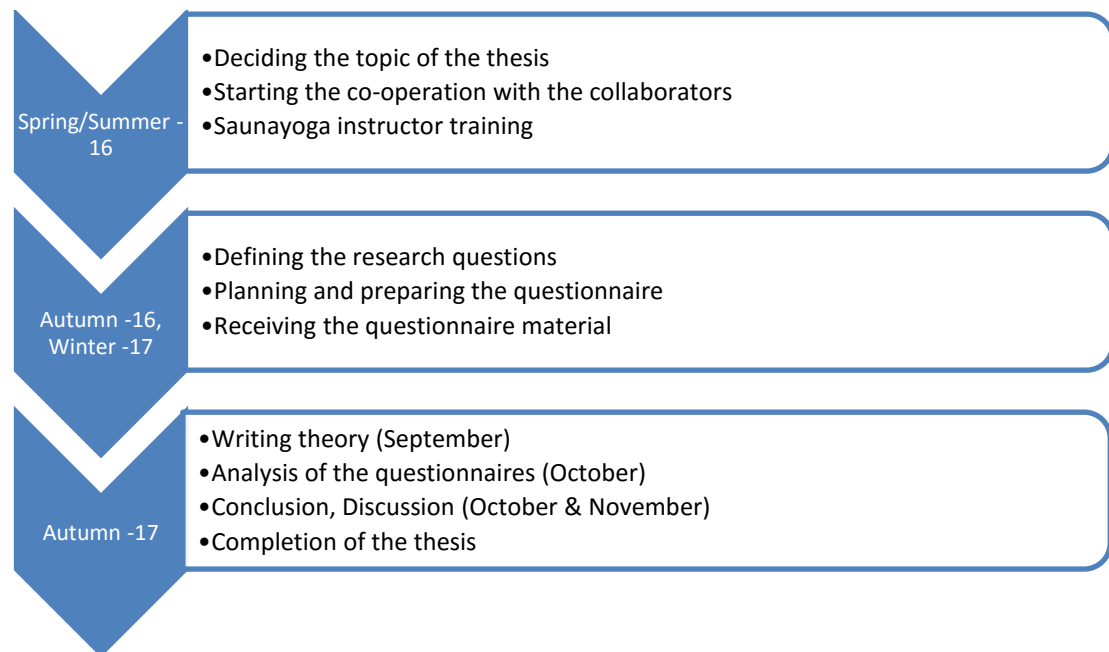


Figure 1. The thesis process.

Saunayoga International Ltd organized a free trial of saunayoga for the members of Finnish Rheumatism Association. The sessions were adapted to be more suitable for this specific client group, people with rheumatic diseases. Saunayoga International Ltd in co-operation with Finnish Rheumatism Association organized a specific peer instructor guide for instructing this adapted form of saunayoga. A traditional saunayoga session was modified by focusing more precisely on mobility of the spine, hips and neck. The focus is on softness and safeness of the movements. As in regular saunayoga, all of the instructed poses can be adapted and modified to person's own condition. (Vainio, 4.11.2017.)

Some people experience aggravation of rheumatic symptoms after sauna-bathing. This aspect was also taken into consideration by advising the participants to take a cold shower instantly after the session. The Finnish Rheumatism Association also published free home exercise videos to make exercising at home easier. (Website of Finnish Rheumatism Association 2016.)

Voluntary participants answered the questionnaire about the experienced session. The questionnaire consisted of 5 open questions and 7 multiple choice questions. In the multiple choice questions, the participants were instructed to choose one or more from the alternatives. They were informed in the questionnaire form about the use of the



material. The research process proceeded in accordance to the research process model developed in Jyväskylä University (Figure 2).

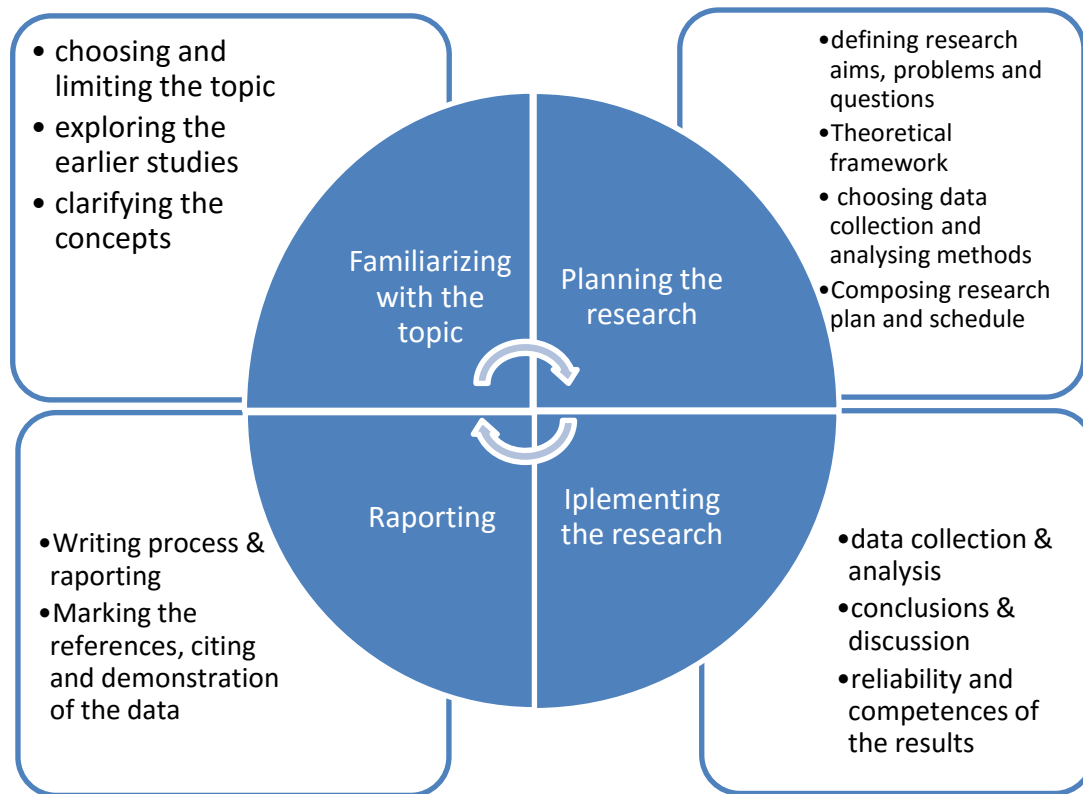


Fig. 2. Research process model (Website of Jyväskylä University 2009).

#### 7.4 Analysis of the results

Received answers were combined together in E-lomake application. E-lomake is an online application developed for creating online forms. The created form receives own online address, where the form can be found and answered. There are different features available where the results can be categorized and analyzed. The data reported to the e-lomake can be seen instantly. Answers can be compared and gathered directly for example in Excel and SPSS forms. (Website of E-lomake.)

The results are transferred into Excel to make holistic analysis and figures. Those are presented using qualitative and quantitative methods. Answers are gathered quantitatively into figures to clearly demonstrate the share of each alternative.

## 7.5 Reliability and ethics

Ethics are important to bear in mind when working on any type of research. Ethics in the field of research includes the author's professional ethics. These consists of ethical principles, norms and values that the author must conform to when practicing one's profession. The general morals in research define what is ethically acceptable and recommended in the researcher's job. Finding reliable information, presenting reliable conclusions, collecting and handling the research material and respecting the participants' privacy and trust are central norms within the research field. (Kuula 2006, 23-24.)

Norms considering treatment of the participants are especially crucial within the health care field. The central baseline in norms within research ethics in health care are the values that expresses the respect for people. Three main factors of these values are participants' self-determination, not causing harm for them and respecting their privacy. (Kuula 2006, 59.)

Self-determination means that the participant has a right to decide about their participation and leaving the study if necessary. Participants are entitled to receive enough information about the study, such as time, reasons for the study and use of the received data. Avoidance of causing physical and mental harm is another ethical main principle. The researcher has responsibility not to cause harm with own actions or by the study methods. Respecting the participants' privacy includes for instance anonymous reporting, participant permission in where to use the data and following the confidentiality legislation. (Kuula 2006, 60-64.)

In this thesis process, the author has aspired to work within the ethics and norms that she got acquainted with in the beginning of the project. Principally updated, quality

resources and critical thinking have been used throughout the project. Within the analysis and information search, remaining the genuineness and caution in the work has been focused on.

The participants have been treated ethically correctly. Because of the anonymous questionnaire, participants' identity isn't revealed. Information about the author, this project and its use were presented in the questionnaire form. Answering to the questionnaires was voluntary and everyone taking part in the free trials weren't obligated to participate this study.

## 8 RESULTS

### 8.1 Movements

Saunayoga consist of three types of poses: strengthening, stretching and calming (Website of Saunayoga 2014). The participants were asked in the questionnaire, which one of these was the most beneficial for them. The participants could choose one or more options.

59% of the participants experienced the stretching poses in saunayoga to be the most beneficial for their condition. Stretching indeed is recommended for rheumatic conditions as it lubricates the stiff joints adding the range of motion in the joints. Stretching a warm muscle is more efficient: it can stretch longer and tolerate more, preventing from injuries. (Website of Arthritis Foundation 2017.) Stretching is listed to be one of the most common and recommended self-care intervention among people with arthritis (Brosseau et al. 2004, 7).

The calming poses were reported to be most beneficial for 27% of the participants. Calming poses focuses especially on breathing and body awareness. (Schöps 2013, 21) 14% experienced the strengthening movements to be the best fit for their condition. Results are presented in Figure 3.

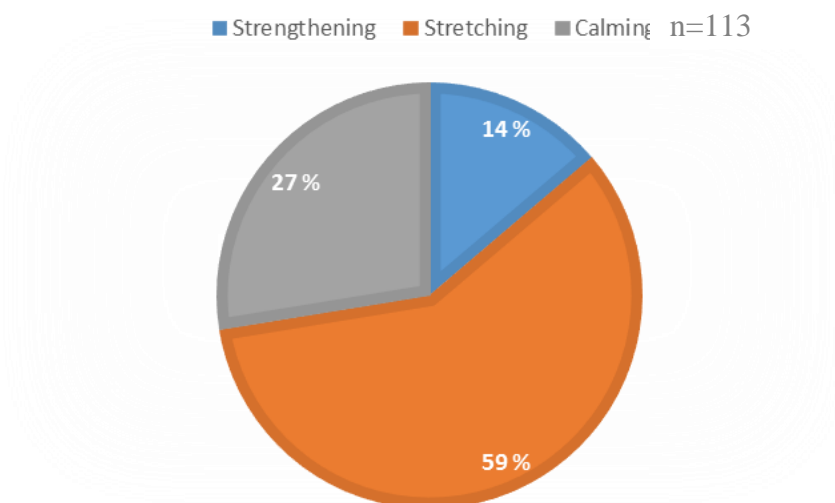


Figure 3. The type of poses the participants found the most beneficial.

## 8.2 Heat

The participants were asked in the questionnaire about how they experienced the heat effecting on the exercising. Majority experienced a lot of effect compared to exercising in regular conditions. 35 answers were reported to have somewhat effect. One experienced no effect at all. “Remarkable effect” was chosen by 18 participants and 4 participants reported “I don’t know”. (Figure 4.)

Heat has been examined to affect especially on joint mobility and pain reduction among people with rheumatic diseases (Hayes 2005, 162). Hyperthermia developed in sauna warms up the musculature adding elasticity, allowing them to stretch more and function better (Nosaka, Sakamoto, Newton & Sacco 2004, 135).

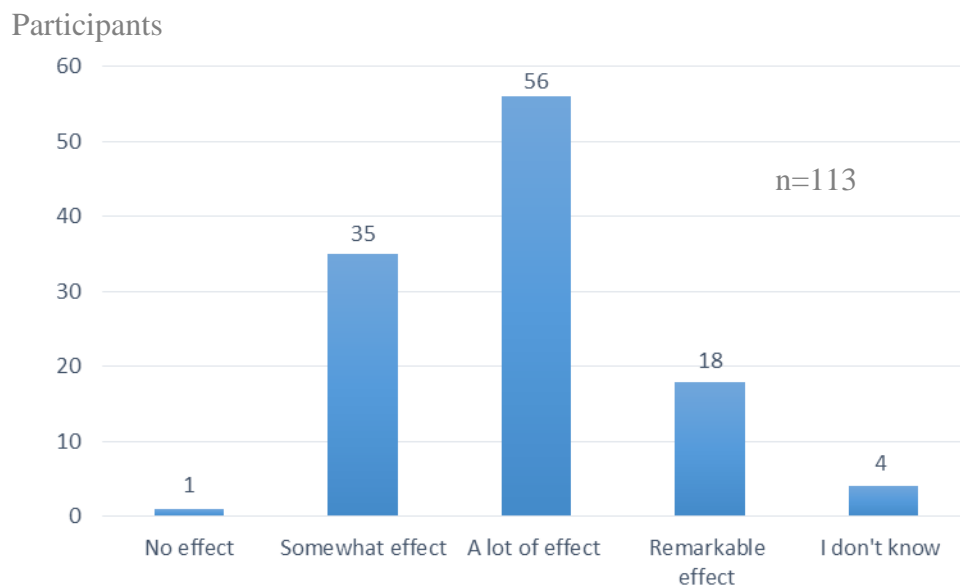


Figure 4. Effect of warmth in the exercise.

## 8.3 Intensity

The suitability of the instructed poses were recorded adequate by the majority of the answerers. “Difficult” was reported twice, “heavy/painful” wasn’t chosen at all. 16

people experienced the poses easy. (Figure 5). Pain should not be experienced while practicing yoga. (Website of WebMD, 2016)

Participants

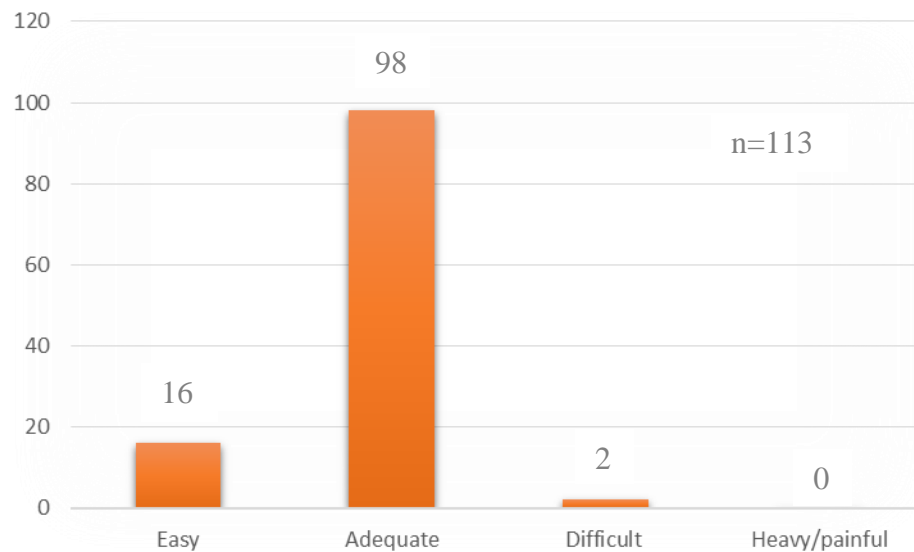


Figure 5. Participants' subjective experiences on the instructed poses

#### 8.4 Environment

The open question in the questionnaire was considering the aspects of exercising in sauna. Participants were asked about the pros and cons of exercising specifically in sauna. Majority of the answers were positive. Most of the positive aspects included the warmth, relaxation and silent, calm environment. Also the easy accessibility of sauna as an exercise place was recorded commonly. Warmth of the sauna was the most common answer and especially the relaxation and stretching resulting from the heat were found beneficial.

However, the best aspect of sauna for one, might be the worse factor for the other. Heat of sauna was also most often recorded as a minus-side of exercising in sauna. It was recorded that for some people the warm environment isn't suitable. It has been investigated, that heat therapy is not recommended for joints in acute inflammatory stage, enabling the aggravation of the disease process. (Hayes 2005, 157.) Some recorded about the possible deficit of oxygen or hydration, causing dizziness or headache

occurring later in the evening. Underneath is listed some examples of different answers received.

Environment:

*“No hustle, I was able to concentrate”*

*“Dim lighting relaxes”*

*“One must be careful with the heat of sauna and remember to drink enough”*

*“Don’t have to be in front of mirror.”*

*“Sauna is a safe, dim place where the warmth embraces. Circumstances in Sauna don’t fit for everyone, but everyone should try!”*

*“Able to go to sauna and shower right after”*

Relaxation:

*“Relaxation and calm movements”*

*“Muscles stayed relaxed, no cramps during the stretches”*

*“Relaxation, if sauna isn’t too hot”*

Warmth:

*“Warmth suits me and the musculature is ready instantly. Warmth isn’t suitable for everyone”*

*“The warmth absolutely. No bad sides.”*

*“Warmth stretches me differently”*

Negative feedback:

*“Maybe I experienced shortage of oxygen, had headache the next day”*

*“Dizzy feeling”*

*“Sitting felt heavy for the back”*

*“The sauna was a little crowded”*

## 9 CONCLUSION

Based on the results after one trial of saunayoga 110 out of 113 answerers would try it again. The main factor of saunayoga was the abnormal, warm environment for exercising. Majority of the participants found exercising in sauna to have beneficial effects. Mainly the warmth of the sauna was recorded beneficial by warming the musculature and enabling for a deeper the stretch. The warmth was also described as gentle and relaxing, dim and safe space adding the indulgent aspect to the session. Many participants were also interested implementing these kind of poses independently in own saunas. Easy accessibility of sauna lowers the threshold of exercising, because of the ability of using own home as an exercise place. Warmth however isn't suitable for everyone depending on the individual and the features of the disease. Based on the questionnaire some participants experienced it causing dizziness or headache, according to them those were also believed to be caused by the lack of hydration.

Many participants reported about deeper or different type of stretching of the muscles when being in the sauna. Therefore stretching poses were also reported to be the most suitable type of poses for the majority of the participants. The instructed program was suitable for this specific client group, people with rheumatic diseases. The poses and the intensity were adequate for the majority and no one felt the session heavy or painful.

Expectations for saunayoga included mostly new experiences and soft and gentle form of exercising and relaxation. For the majority of the participants these expectations fulfilled. The expectations were also reported being exceeded. Many people did not know what to expect but were surprised positively. Saunayoga was an entirely new form of exercising for the majority of the attendances.

Based on these results saunayoga is found beneficial and relaxing form of exercise and can be recommended to be tried for people with rheumatic diseases. However it is essential to remember the differences of responding to saunayoga between individuals.



## 10 DISCUSSION

The initial plan concerning the schedule and methods of this thesis has changed and modified along the process. Also the research questions and aims have been changed, defined and specified throughout the journey.

This thesis process proceeded principally according to the basic phases of research process. The project started by getting acquainted with the topic and familiarizing with the central concepts of the thesis: saunayoga and fundamentals of rheumatic diseases. Familiarizing with the topic included exploring some earlier studies and materials concerning the topic. Those were mostly dealing with heat therapies' or warm environment's effect on rheumatoid arthritis, for example. Getting deeper knowledge of the concepts was beneficial for the next phase, planning the research.

Planning the research required precise and detailed focusing on limiting the final aims and questions of the actual research. With the specified definitions writing the theoretical framework could be started. The data collection and analyzing methods were also mainly determined at this point. Data was collected in a form of a questionnaire, mostly within quantitative methods. The schedule of this research process began to take shape as the dates of collecting the questionnaires clarified. Final limitation of the research questions that are analyzed in this thesis took place after receiving the materials. After receiving the answers, the data was collected and ready to be analyzed. Becoming familiar with different methods of research to find the most suitable for this case occurred before starting the analysis. While implementing, concluding and analyzing the research the reliability was also estimated.

Saunayoga, as a rather new innovation, has been studied little. Since it has been found beneficial and popular among people with rheumatic diseases, further high-quality studies should be conducted. As this thesis concludes, saunayoga can be beneficial for people with rheumatic diseases but possibly also for many other conditions as well. It affects the whole body by gentle movements and is suitable for many, independent on the age or condition. Within more scientific evidence saunayoga could become a fitting

part of a treatment plan for many. In addition to saunayoga also scientific evidence on hot yoga is lacking. Heats impact on rheumatic joints has been investigated mainly by superficial, local heat treatments that differs from sauna's comprehensive effects substantially. Sauna bathing is very popular especially in Finland but also around the world and would be worthwhile to be studied more.

These results from the questionnaires can be used for developmental work for the co-operators but also could be utilized for further research. For example another bachelor thesis could be done using the received material with different research questions and aims. There are many possibilities for further research on the topic and ideas of how to make the research more beneficial and precise has aroused during the process. The questionnaire did not clarify the diagnosis of the participants, so the results consider a very wide and diverse range of diseases and symptoms. Also the disease activity and pain thresholds could have varied between individuals, effecting to the reliability of the study. Limiting the target group could have provided more reliable and specified results. Also the theoretical part of the thesis would profit from limiting the topic even more, enabling to focus deeper for example on one specific rheumatic disease. In addition, it would be interesting to see long-term effects of saunayoga exercising for people with rheumatic diseases. The results could vary markedly compared to this one time trial. For example measuring the range of motions in joints before and after one session or longer period of exercising saunayoga, could provide concrete results.

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## APPENDIX 1

Hei! Olen Liinu Lehtola, fysioterapiaopiskelija Satakunnan Ammattikorkeakoulusta. Teen opinnäytetyönäni selvitystä Saunajoogan vaikutuksista reumaa sairastaville.

Vastaa lyhyesti tai valitse vaihtoehtoista.

### Saunajooga

1. Mikä sai sinut kokeilemaan Saunajoogaa?

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2. Millaisia odotuksia Sinulla oli ennen tuntia? Täyttyivätkö odotukset?

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### Sauna & Lämpö

3. Miten koet lämmön vaikuttavan harjoitteluun?

- ☐ ei vaikutusta
- ☐ jonkin verran vaikutusta
- ☐ paljon vaikutusta
- ☐ erittäin paljon vaikutusta
- ☐ en osaa sanoa

4. Tuoko sauna liikuntapaikkana jotakin uutta harjoitteluun? Mitä?

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5. Mitä hyviä puolia saunassa harjoittelulla mielestäsi on? Entä huonoja?

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### **Liikkeet & harjoitteet**

6. Olivatko ohjatut liikkeet mielestäsi...

- ☐ Helppoja
- ☐ Sopivia
- ☐ Vaikeita
- ☐ Raskaita/kivuliaita

7. Minkälaiset liikkeet koet Sinulle hyödyllisimmiksi?

- ☐ vahvistavat
- ☐ venyttävät
- ☐ rauhoittavat

8. Millainen olo tunnista jäi? Valitse yksi tai useampi vaihtoehto

- ☐ rentoutunut
- ☐ jännittynyt
- ☐ lämmin
- ☐ uupunut
- ☐ huonovointinen
- ☐ virkistynyt
- ☐ kivulias
- ☐ kivuton
- ☐ muu, mikä? \_\_\_\_\_

9. Kokeilisitko Saunajoogaa uudestaan?

- ☐ Kyllä
- ☐ En, miksi?

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## **Ohjaus**

10. Millainen on mielestäsi hyvä ohjaaja/vertaisohjaaja?

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## **Kotiharjoittelu**

11. Koetko saunajoogan omaehtoisen harjoittelun kotona olevan mahdollista?

- ☐ Kyllä
- ☐ Ei, miksi?

---

12. Voisitko hyödyntää Reumaliikunta Saunajoogaohjeita omatoimisen harjoittelun tukena?

- ☐ Kyllä
- ☐ En

**Kiitos vastauksestasi!**